AMENDMENTS TO THE CLAIMS

1.(Previously Presented) An apparatus for removing semiconductor chip in which one out of a plurality of semiconductor chips formed from a diced semiconductor wafer is removed from a pressure-sensitive adhesive sheet which holds the semiconductor chips by adhering thereto, so that the semiconductor chip is extracted from the adhesive sheet, comprising:

a removing member having a plurality of protruding portions for coming into contact with a bottom surface of the semiconductor chip through the adhesive sheet and a plurality of suction hole portions formed in recess portions in between the respective protruding portions for sucking the adhesive sheet so as to partially remove the adhesive sheet from the semiconductor chip at suction positions, the protruding portions and the suction hole portions are formed on a first contact surface for the chip through the adhesive sheet;

a holding portion for sucking and holding the adhesive sheet around the removing member by bringing a second contact surface thereof into contact with the adhesive sheet; and

a removing member moving device for moving the removing member along the bottom surface of the semiconductor chip to the holding portion so as to vary each of contact positions of the adhesive sheet with the respective protruding portions of the removing member and each of the suction positions of the adhesive sheet through the respective suction hole portions of the removing member, in a condition that the first contact surface is located at an almost same height of the second contact surface, wherein

in a state that a bottom surface of the adhesive sheet located around the first contact surface of the removing member is sucked and held by the second surface of the holding portion and the adhesive sheet is sucked through the respective suction hole portions on the first contact surface

of the removing member so as to be partially removed, the respective contact positions are moved to the suction positions by moving the removing member by the removing member moving device, so that a region of the partial removal between the bottom surface of the semiconductor chip and the adhesive sheet is made to expand.

2.(Previously Presented) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the removing member is formed so that an adhesion region of the semiconductor chip to be removed to the adhesive sheet is disposed in a region of a top surface of the adhesive sheet corresponding to a movement region of the respective protruding portions of the removing member by the removing member moving device.

3.(Previously Presented) The apparatus for removing semiconductor chip as defined in Claim 2, wherein the holding portion is formed so that a region of a top surface of the adhesive sheet corresponding to a suction region by the holding portion is disposed adjacent or close to the adhesion region of the semiconductor chip to be removed.

4.(Original) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the respective suction hole portions are formed on bottom sections of the respective recess portions, and the bottom surfaces of the adhesive sheet disposed in between respective contact positions by the respective protruding portions adjacent to each other are sucked through the respective suction hole portions so as to be brought into contact with or be close to top surfaces of

the respective recess portions for the removal.

5.(Original) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the semiconductor chip is almost entirely removed from the adhesive sheet by changing an almost entire bonding of the semiconductor chip to the adhesive sheet by adhesion to a partial bonding by suction through the respective suction hole portions, and further moving the removing member by the removing member moving device so as to change positions of the partial bonding and decrease bonding force by the adhesion.

6.(Original) The apparatus for removing semiconductor chips as defined in Claim 1, wherein force of the holding portion to suck and hold the pressure-sensitive adhesive sheet is set to be larger than force of the respective suction hole portions to suck the pressure-sensitive adhesive sheet.

7.(Original) The apparatus for removing semiconductor chip as defined in Claim 1, wherein a movement range of the respective protruding portions in the removing member is set to be larger than at least a formation interval of the respective protruding portions.

8.(Previously Presented) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the movement of the removing member by the removing member moving device is a reciprocal movement of the removing member in a specified direction along the bottom surface of the semiconductor chip.

9.(Original) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the movement of the removing member by the removing member moving device is a rotating movement of the removing member around a direction almost perpendicular to the bottom surface of the semiconductor chip.

10.(Original) The apparatus for removing semiconductor chip as defined in Claim 8, wherein the removing member moving device is operable to move the removing member reciprocationally so as to vibrate the removing member.

11.(Previously Presented) An apparatus for feeding semiconductor chips, comprising:

the apparatus for removing semiconductor chip as defined in Claim 1;

a wafer holding unit for holding the semiconductor wafer in the state of adhering to the adhesive sheet; and

a removing apparatus moving device for relatively moving the apparatus for removing semiconductor chip along a surface of the semiconductor wafer which is held by the wafer holding unit and aligning one out of the respective semiconductor chips and the removing member; wherein

the semiconductor chips are removed from the adhesive sheet so that the semiconductor chips are fed.

12.(Previously Presented) A method for removing semiconductor chip in which one out of a plurality of semiconductor chips formed from a diced semiconductor wafer is removed from a

pressure-sensitive adhesive sheet which holds the semiconductor chips by adhering thereto, so that the semiconductor chip is extracted from the adhesive sheet, comprising:

bringing a plurality of protruding portions on a first contact surface of a removing member into contact with a bottom surface of the semiconductor chip through the adhesive sheet at a region on a bottom surface side of the adhesive sheet while sucking and holding a vicinity of the bottom surface-side region of the adhesive sheet corresponding to an adhesion region of the semiconductor chip by a second contact surface of a holding portion located around the first contact surface;

sucking the adhesive sheet in between the respective protruding portions so as to partially remove the adhesive sheet in the adhesion region from the semiconductor chip at suction positions;

moving respective contact positions with the protruding portions to the suction positions on the bottom surface-side region of the adhesive sheet by moving the removing member along the bottom surface of the semiconductor chip to the holding portion, in a condition that the first contact surface is located at an almost same height of the second contact surface, so that a region of the partial removal in the adhesion region is made to expand.

13.(Previously Presented) The method for removing semiconductor chip as defined in Claim 12, wherein force to suck and hold the vicinity of the bottom surface-region of the adhesive sheet corresponding to the adhesion region is set to be larger than force to suck the adhesive sheet in between the respective protruding portions.

14.(Currently Amended) The method for removing semiconductor chip as defined in Claim 12, wherein the movement of the removing member is a reciprocal movement of the removing member in a specified direction along the bottom surface of the semiconductor chip.

15.(Previously Presented) The method for removing semiconductor chip as defined in Claim 14, wherein an amplitude in the reciprocal movement of the removing member is larger than a formation interval of the respective protruding portions.

16.(Previously Presented) The method for removing semiconductor chip as defined in Claim 12, wherein the movement of the removing member is a rotating movement of the removing member around a direction almost perpendicular to the bottom surface of the semiconductor chip.

17.(Previously Presented) The apparatus for removing semiconductor chip as defined in Claim 1, wherein the movement of the removing member by the removing member moving device is a reciprocal movement of the removing member in a specified direction with a specified amplitude along the bottom surface of the semiconductor chip.

18.(Previously Presented) The method for removing semiconductor chip as defined in Claim 12, wherein the movement of the removing member is a reciprocal movement of the removing member in a specified direction with a specified amplitude along the bottom surface of the semiconductor chip.

19.(Previously Presented) The apparatus for removing semiconductor chip as defined in Claim 1, further comprising:

a first suction pressure transmitting pipeline which is connected to the first contact surface of the removing member so as to transmit a suction pressure for sucking and holding the adhesive sheet, on which a first open/close valve is installed for controlling transmission of the suction pressure,

a second suction pressure transmitting pipeline which is connected to the second contact surface of the holding portion so as to transmit a suction pressure for sucking and holding the adhesive sheet, on which a second open/close valve is installed for controlling transmission of the suction pressure, and

control section which is operable to conduct timing control for moving operation of the removing member by the removing member moving device and suction pressure transmitting operation by controlling the first and second open/close valves individually, wherein

in a state that a bottom surface of the adhesive sheet located around the first contact surface of the removing member is sucked and held by the second surface of the holding portion and the adhesive sheet is sucked through the respective suction hole portions on the first contact surface of the removing member so as to be partially removed by conducting the suction pressure transmitting operation, the respective contact positions are moved to the suction positions by conducting the moving operation of the removing member by the removing member moving device, so that a region of the partial removal between the bottom surface of the semiconductor chip and the adhesive sheet is made to expand.